# Learners Self-directing Learning in FutureLearn MOOCs: A Learner-Centered Study

## Conference or Workshop Item

# Learners Self-directing Learning in FutureLearn MOOCs: A Learner-Centered Study

Inge de Waard and Agnes Kukulska-Hulme

The Open University, Walton Hall, MK7 6AA Milton Keynes, UK

## 1 Literature

### 1.1 The Need for Bottom-up Self-Directed Learning Studies in MOOCs

Research focusing on self-directed learning (SDL) is important if we want to understand how learners set out their path in online courses such as MOOCs [2, 3]. When looking at who engages in MOOCs, most learners are already employed, well educated, from developed countries and have higher levels of formal education [4, 5]. This means that learning within MOOCs is done by adults, and concepts from adult learning are of interest in MOOC research. Knowles [6] promoted the concept of andragogy for adult learning and he defined SDL as: the process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing learning strategies, and evaluating learning outcomes.

When looking at MOOC research a gap can be situated regarding the its topics. Investigating research topics, Zhu, Sari, and Bonk [7] systematically reviewed MOOC research methods and topics based on 197 studies published from October 2014 to July 2017 (in two phases). They found that 52% was student-focused, but the topics were related to learner motivation, retention and completion, assessment, and instruction design using a more top down approach based on indicators coming from formal education. This aligns with earlier research where Veletsianos and Shepherdson [4] made a systematic analysis of 183 empirical MOOC papers published between 2013 – 2015. They [4] identified student-focused studies as the most common research strand within empirical MOOC research, accounting for 84% of the literature in their study. Their analysis also reveals that these student-centered studies were mainly looking at completion and retention rates, as well as learner subpopulations, but not the full MOOC learning experience. Veletsianos and Shepherdson [4] add that even though their results suggest that research on MOOCs focuses on student-related topics, learners' voices were largely absent in the literature, with learner voices referring to data coming straight from the learners' stories. The study we report in this paper provides a better understanding of how adult learners self-direct their learning within FutureLearn courses, to shed light on the overall learning experience and enabling the learners' voices to emerge from the data, using a bottom-up approach.

### 1.2 Learners Engaging in MOOCs

Kizilcec and Schneiders [8] concluded that there has not been a systematic approach to identifying learners' motivations or how these motivations relate to subsequent learning. But understanding motivational factors is not enough. As Terras and Ramsay [9] pointed out, researchers also need to understand learners' expectations and how they cope with the specific challenges that are associated with MOOCs. Wong et al. [3] emphasized that highly diverse groups of learners enrolled in MOOCs are required to make decisions related to their own learning activities to achieve academic success. Wong et al. [3] saw that many studies find positive self-regulated learning and learning outcomes among undergraduates, but there is no evidence or indication that such findings would transfer to a different population or setting. Guo and Renicke [10] investigated how learners navigate through MOOCs and they found that most learners engage in non-linear learning trajectories that do not follow a pre-established, sequential progression. Guo and Renicke also concluded that older learners follow nonlinear, self-defined learning paths, indicative of a field-independent learning style.

However, 'older' might not be a valid term when it comes to online learning, as age is much more relevant in formal learning than in online learning or lifelong learning. Due to the limited interaction between MOOC facilitators and learners, the onus is placed on

individual learners to create and navigate their own learning journey [11]. This also puts a greater responsibility on the learner. Reich [12] stated that a collective research effort is required to fully understand the impact of MOOCs, and added that we have terabytes of data about what students clicked and very little understanding of what changed in their heads.

### 1.3 Self-regulated Versus Self-directed Learning

Self-directed and self-regulated learning have similarities with respect to active engagement, goal-directed behaviour, metacognitive skills, and intrinsic motivation [13] adding that SDL sees learners as having more control over the learning environment, which provides the learner with the potential of initiating a learning task. Loyens, Magda & Rikers [13] look at SDL in problem-based learning and its relationship to selfregulated learning. The paper established conceptual clarity between SDL and selfregulated learning. They conclude that the concept of SDL is broader than self-regulated learning. SDL as a design feature of the learning environment stresses students' freedom in the pursuit of their learning [13]. This fits the content reality of MOOCs, where learners are supposed to choose what to learn, when and why.

## 2 Research Questions

The following central research question and consecutive sub-questions emerged after several iterations of research questions based on the learner experiences shared by the participants. The central research question: What characterises the informal selfdirected learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC?

The central research question is divided into four sub-questions:

- Which individual characteristics influence the learning experience?
- What are the technical & media elements influencing a learning experience?
- How does individual and social learning affect the participants' learning?
- Which actions (if any) did the learners undertake to organise their learning?

## 3 Research Methodology

Literature showed that little was known about the actual learning experience of adult learners in FutureLearn courses, which embedded the study in the empirical world. It also needed an inductive direction: beginning with observing the empirical world, and then reflecting on what is taking place while moving towards theoretical concepts. There were two potential qualitative research approaches: a phenomenological approach or using Grounded Theory. Both strategies of inquiry provided guidance on investigating human beings in a specific setting. Both methods provided options for consciously integrating the researchers' point of view into the actual experiences. This was important to monitor possible personal assumptions on the subject, allowing a more reflective stance towards data emerging from the data analysis phase. Creswell [14] mentioned that using a Grounded Theory approach evokes the need to select a purposeful, homogeneous sample of participants to build a sound theoretical framework. In GT, the individuals may not be located at a single site; in fact, if they are dispersed, they can provide important contextual research. This openness of GT towards the dispersed location of participants fits the reality of global online learners.

### 3.1 Target Population

A selection of 56 participants was made to investigate their self-directed learning. All the participants signed the informed consent after they were voluntarily attracted from three FutureLearn courses: "The Science of Medicines" organised by Monash University in Australia, "Basic science: Understanding Experiments" organised by The Open University in the United Kingdom, and "Decision Making in an Increasingly Complex and Uncertain World" organised by the University of Groningen in the Netherlands. These three publicly available courses were all rolled out for the first time during the last months of 2014. All the participants had at least 2 years experience in online learning.

### 3.2 Data Collection

The data for this study were collected at three different stages: an online survey (at the start of the course consisting of 3 multiple choice questions and 1 open question), learning logs (during the course consisting of 18 open and closed questions), and semistructured one-on-one interviews with participants (post-course, 12 questions) carried out remotely. The online survey was sent to the participants at the beginning of the course, to be able to gather background information on prior online learning experience and the use of different devices (tablets, smartphones, laptops, etc.). Based on the information shared through the online survey the target group of experienced online learners with at least two years of prior online learning was chosen. This was important to ensure that the self-directed learning would not be blurred by having to learn how to learn in an online environment such as a MOOC platform.

The learners self-reported on their FutureLearn course learning experiences by filling in learning logs provided to them via mail by the principal researcher. The learning logs [15] consisted of open and closed questions, inviting the participants to describe their learning episodes. A learning episode consists of a sustained, deliberate effort from the learner to learn [16]. A learning episode can consist of one or multiple learning actions undertaken during the same learning episode. The information provided in their learning logs were where possible cross-checked with the data log files in the platform (not all learner actions can be cross-checked, as the platform data logs are limited). The semi-structured one-on-one interviews took place post-course to gain a more in-depth understanding of the actual learning experience of the learners based on their reflections on the experience. The questions for those interviews were derived from the sub-questions related to this study, as well as from emerging themes when going through the data from the learning logs.

### 3.3 Data Analysis

The qualitative data from the online surveys, the learning logs and the one-on-one interviews were analysed using Charmaz's [1] method for constructing a Grounded Theory (GT). 3 different coding cycles were used based on Charmaz constructivist GT, the coding cycles consisted of several iterations until saturation was reached.

- Initial coding: quickly screening all the data to get a feel of possible big subjects mentioned by the data
- Line-by-line coding, a strategy which prompts the researcher to study the data closely and begin conceptualization of the ideas (Charmaz, 2006)
- Focused coding, which permits the researcher to separate, sort and synthesize large amounts of data (Charmaz, 2006)

GT provides a flexible way of conducting research that prioritizes exploration of the given phenomenon in a predominantly inductive theory development paradigm [16]. Using an approach that covered the pre-course, during course and post-course data coming from the learners' voices, offered a view into the learner experience from the beginning which is an important factor of Constructed GT as suggested by Charmaz [1]. The participant data was coded as described in Table 1.

Participants were asked to submit a learning log every two weeks. Although not all participants sent their learning logs as requested, the learning log frequency per two weeks (see Table 2) shows participant persistency through their course.
This persistency is consistent with Charmaz's [1] emphasis on the importance on retrieving data from participants at different points in time. This adds to the validity and rigor of this study in terms of consistently having collected participant data throughout the duration of the study.

Table 1. Learner data coding description

## 4 Research Findings

4.1 Individual Characteristics

The term 'individual characteristic' identifies the character traits of the learner. The character traits were self-identified by the learner. Two main categories emerged: motivation and personal traits including emotions influencing the learning process.

Motivation. Motivation can influence what, when, and how people learn. Motivation is stimulated or limited within MOOCs by: choosing the course, professional versus personal motivation, and leisure learning. In motivation a distinction is made between intrinsic and extrinsic motivation based on the different reasons or goals that give rise to an action. Intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome [17].

Choosing a Course. The learners chose and registered for specific MOOCs following their own preferences. This choice was based on a personal decision.

Motivation as Mentioned Pre-course. In the pre-course online survey, one question investigated the learners' reason for registering for that course. Motivation overall, as well as the percentages for motivation per course are provided in Table 3.

61% of the participants indicated they had a specific personal interest in the course. The personal interest for the BSE course is significantly higher than the other two courses. The learning logs and the interviews showed that the BSE learners were primarily interested in enhancing the family's knowledge of scientific experiments, e.g. learning about experiments with their children. Among all the participants 38% had a professional interest.

Motivation as Mentioned in Learning Logs and Interviews. When coding the learning logs and post-course interviews, they revealed that the professional or personal motivation varies per course (see Table 4).

Table 3. Looking at personal or professional interest for joining the FutureLearn courses

The biggest difference in motivation was in the DMCW and BSE courses. The DMCW course is mentioned more frequently in relation to the participants' professional motivation, and the BSE course had more learners referring to it based on their personal interest. Comparing the content, the DMCW participants refer to the immediate integration of the course content into their professional work and/or the work of colleagues. The BSE learners refer to family and learning within the family unit.

Personal and Professional Motivation for Completing a Learning Episode. The log data on completing a learning episode (see Table 5) revealed that learning episodes were more frequently finished within their course weeks by the professionally motivated learners (74%) especially if the content was immediately of interest, while the personally motivated learners intended to pick up the learning activities later on (62%). In the self-reported learning logs the participants indicated that 79% of their learning episodes were successful. Success is task-related, and a personal feeling of success made explicit by an emotional remark or indicated as successful by the participant. The results show that self-directed learning within MOOCs is driven or held back by intrinsic motivation, depending on the course content and personal interpretation of the usefulness of the course for the learner's benefit. This makes intrinsic motivation an inhibitor or enabler of self-directed learning in MOOCs.

Table 4. Percentage of motivational excerpts from learning logs referring to either personal or professional motivation per course

Personal Traits and Emotions Influencing the Learning Process. Two personal traits emerged most frequently during the line-by-line data analysis: perseverance and self-confidence.

Perseverance. Perseverance was mentioned by 16 participants. Some learners referred to it in relation to 'learning to perfection', where learners indicated that they had to reflect on whether or not to learn all the details of a course: "I only deem it fit to quit after I have learned all there is to learn on the subject matter. I hate failure, especially, in achieving a learning objective." (#DMCW/I/220). Perseverance was also linked to a

general view of learning and how learning should be undertaken, e.g. “first I need to understand before moving on” (#DMCW/LL/152).
The act of persevering can be linked to a specific personal learning interest, e.g. “I persevered to understand what was important for me to know and left the rest. So nobody motivated me and I am not motivated to understand what is irrelevant to my health and wellbeing.” #SOM/LL/113.

Self-confidence. Self-confidence was mentioned explicitly by 15 participants. The data related to self-confidence ranged from the learner’s views on their own learning: “I’ve found that my brain wasn’t so stiff and still opened for some new knowledge” (#DMCW/I/167), to learning within the course itself: “First I felt stupid but then I reminded myself that that is why we do experiments, to test our hypothesis and not just make assumptions” (#BSE/LL/132). Self-confidence was most frequently referred to in terms of daring or doubting to engage in social learning.

Self-confidence impacting social learning: Self-confidence plays a role in triggering social learning action. Hovering between individual and social learning are those learners that seem to be willing to interact with others, yet do not always feel certain enough. Sometimes this is due to a practical element: “Connecting with others was a bit more difficult this time, because it was in English and I’m not a native speaker in English” (#DMCW/I/222), at other times it is related to a personal sense of esteem or pride or emotion: “I wouldn’t dream of asking anyone to help me. This is not life or death and does not involve money so I just get on with it myself” (#SOM/LL/113). Or has a positive effect: “I found it helped to discuss what I had learned with someone…. This is something I have avoided doing until now, it really helps” (#SOM/LL/101).

Emotional language and learning: In both learning logs and interviews the participants used emotional language to support their self-reported learning experience. The emerging data suggested that content and facilitators can inspire the learner, e.g. “I enjoyed learning, especially the content of the first few weeks and both the content that Jennifer presented and her enthusiasm in the second half of the MOOC were great.” (#DMCW/I/222). Emotional language was also used when learners decided to stop learning at that moment in time: “so I reckoned that I was not in the mood for learning and so I gave up” (#DMCW/LL/140).

Personal traits and emotions play a role in the MOOC learning experience. Specific personal traits such as self-confidence and perseverance let the learners self-direct their learning towards specific learning actions. While emotions color the learning experience, they can deter or stimulate learners from learning.

### 4.2 Technical and Media Elements Influencing SDL

Technology is a necessary component of online learning, as learners need technology to access the learning material. Two categories emerged: devices used and learning new tools suggested in the courses.

Devices Used. MOOCs are only accessible online, but some resources (e.g. videos, transcripts, and texts) could be downloaded for offline use. Table 6 gives an overview of which devices were used to access the course.
The other devices comprised smart-TVs and a hybrid device. Depending on the demand of the course resources (e.g. processor demanding tools, or visually complex tools) different devices were chosen. Learners indicated that they worked with a preferred device, e.g. “We used the tablet when we were performing the experiments in the kitchen” (#BSE/I/111). Depending on the context learners switched to other devices: “I used mainly my laptop. Tablet in bed and smartphone outside.” (#DMCW/I/148).
Learning New Tools Suggested in Courses. Learners shared remarks on specific tools that were part of a MOOC. In the case of the Decision Making in a Complex World course, the facilitators referred to tools that are used to demystify complexity in networks. One tool was called Lightbeam (for Firefox browser). This tool was highlighted

in the learning logs by 11% of the DMCW learners, although it was not a mandatory tool to explore. The tool triggered interest due to its personal and professional potential. Lightbeam is a tool to visualize who is following your own writing or any electronic actions on the web: "I learned how to detect who was monitoring my online activities" (#DMCW/LL/126). Another tool was mentioned by 34% of the participants: NetLogo. This tool had a professional use and was suggested as part of the course exercises. While Lightbeam provoked a higher personal interest, NetLogo aroused an immediate professional implementation interest. In both cases the participants were eager to learn these new tools, even though it required extra effort.

4.3 Individual Versus Social Learning

The main categories that emerged were: individual learning actions, social learning in relation to connecting and sharing, and social learning actions.

Individual Learning Actions. 63% of the learners completed the learning episodes by themselves, learning individually and subsequently addressed as 'individual learners' in this section. Individual learners use a variety of learning actions, such as: viewing and reading course media, reflecting on content, looking for answers on the internet, linking to prior knowledge. Although lurking, the individual learners did testify that they looked at particular MOOC spaces to find answers to their course related questions: e.g. "I did the whole course individually although I did read other student's inputs which in many cases answered any questions I might have posed" (#BSE/I/109). Lurking seemed to be a deliberate action, following unresolved questions, "I really only look to see what others have written if I don't know the answer" (#SOM/LL/104).

Table 6. Devices used by the learners to access the course (n=147)

Individual learners find learning solutions by looking at online and offline options to increase what they perceive as learning success in the MOOCs.

Social Learning: Connecting and Sharing. Social learning is a natural learning phenomenon, as people use dialogue to increase their understanding.

Looking for Answers Versus Experience Sharing. When investigating who learners turned to while learning, this study made a distinction between who participants turn to while looking for answers (i.e. asking questions on subject), and who they share their course experiences with (i.e. sharing the experience), see Table 7. In this section only the quantitative data from BSE and the DMCW course were considered, as there were only 4 SOM participants engaging in social learning activities.

Learners consider who would be able to help them, indicating an overlap of interests or contexts within their personal relationships: with friends "I will contact people that I know, my friends, who are experts in a certain field. Sometimes I would write an email to an expert that I do not know personal" (#DMCW/LL/132), and partners: "The [theoretical] principals are very useful in a number of ways. For my partner it answers a number of questions of what is happening in her work too" (#DMCW/LL/131).

Learners also shared their own knowledge. Learners considered where their additions would be helpful: "I picked up the course where I had left off yesterday, and started by looking at the comments left on my posts (mostly comments on other people's posts to start with), and responded to those where I felt that I had something to say" (#DMCW/LL/149).

Table 7. Who people turned to in order to find answers and who people connected to in order to share their MOOC experiences

Social Learning Actions. Social learning involves learners interacting with each other, either online or in real life.

Choosing Who to Interact With. In a MOOC, learners need to decide who they want to connect to within a short timeframe (duration of the MOOC). FutureLearn offers the option to 'follow' other learners or indicate which comments you 'like', both options being used by learners to facilitate their learning, but because of the size of the learner group this selection procedure does not always feel exactly right as the following

learner testifies: “The comments in a MOOC of this size are really difficult to keep track of ... even selecting accurately whom I would like to ‘follow’ ”. (#DMCW/LL/124). The learners who engage in social learning are actively searching for ways to optimise their social learning experience.

Reflective Actions and Cohort Learning. Reflecting on the content was a recurring action in the learning logs, ranging from individual reflecting to social reflecting. FutureLearn MOOCs have a clear starting point, thus offering the opportunity to move forward in a cohort of learners. Cohort learning can provide a group feeling for learners: “I found posting on the comments sections on pages and reading replies helped my understanding. I decided to do this when I read the first 30 or so comments and found useful information in them that made sense to me” (#DMCW/I/107). Although not everyone learns in the designated timeframe as set out by the course organiser, cohort learning adds to a group feeling, as well as to the participants’ learning experience.

4.4 Structuring Learning

The MOOC participants self-directed their learning based on: scheduling, taking notes, and personal goal setting.

Scheduling. The option to learn the MOOC modules or elements in a way that feels logical for the participant (not necessarily to the prescribed learning path), leaves room to the participant for self-directing and organizing their learning based on their own agenda and needs.

Available Time. Learners mediate the time they are willing and able to put into the course throughout the duration of the course and will re-evaluate that time investment depending on new factors (e.g. workload increase, relevance of content): “work has been very busy and so the course has taken a bit of a back seat. Previously, if learning episodes have been difficult I will sometimes just move on and accept I may not understand or complete that particular challenge” (#DMCW/LL/125).

Time Investment in Social Learning. Learners referred to the time investment of social learning or time they were willing to dedicate to discussions: “The discussions are sometimes so long as to be unreadable (200+ comments). One thing I have learnt is that reading everything is impossible.” (#DMCW/LL/124). Social learning depends on the learner’s willingness to invest time, e.g. “Time management has enabled me to prioritise my learning into depth of meaningfulness” (#BSE/I/134). The renegotiation of time stands in relation to the usefulness of the content as perceived by the learner.

Keeping Notes. Keeping notes was a frequent action to organise learning, and it occurred in all three courses. 70% of the participants indicated that they kept a personal learning record, either digitally or on paper or a mixture of both. What changed was the sorts of notes they were kept: some skipped between tools, others used different types of note taking: “For the important information from the course I either create mind maps for quick reference or write brief notes. This enables me to go back through the information to firm up my understanding” (#DMCW/LL/125). 48% of the participants indicated that they used some sort of personal notebook. Learners used tools for taking notes as described in Table 8.

The ‘other’ options for keeping a personal notebook comprised specific online tools: Evernote, OneNote, audio recordings, digital notes (Word), and Notepad. Keeping notes emerged as a common way to self-direct and organise learning. The way learners keep notes is related to their previous familiarity with certain note-keeping tools.

Personal Goal Setting. The informal character of MOOCs allows learners to look set out personal learning goals when registering for courses, as learners can access the content and interact based on their own preferences or needs. The personal goals can be related to personal and professional interests. Some learners saw the MOOCs as a form of continued professional development, e.g. “[I want to] understand what entrepreneurship is and reflect on how it might apply to my work (director in a local authority)” (#DMCW/LL/111), or a way to further their personal goals, e.g. “The main impact is that I’m now putting together my PhD proposal on Network models, thanks to the course” (#DMCW/I/220).

Range of Personal Learning Goals. The learning goals set by the participants vary from

specific, personal goals ("prepare for my Bsc which starts in 2015", #BSE/LL/126), to a more general interest ("start thinking like a scientist", #BSE/LL/136), and include specific time related content actions ("I wanted to finish this week's work, videos, quiz etc. before going away", #SOM/LL/105). Twelve learners indicated not having specific learning goals.

Selecting Content. The way learners select content is part of their personal learning goals (based on learning needs they self-define), but also based on prior online learning experiences. Learners selecting specific weeks or sections of a MOOC has an effect on the way they use all the media in those sections. One learner selected quiz questions: "I completed only those quizzes that involved the material I had already covered." (#BSE/LL/106). Another learner solved a quiz question by first discussing it with peers: "One of the quiz questions was difficult and I felt I could not find the response in the course. So I asked the question in the discussion forum, and the professor answered, as did also a bunch of students" (#DMCW/LL/124). MOOC facilitators sometimes include assignments which the learner can embed into their own context or learning goals: "it is definitely a great learning strategy to construct an essay in response to a question based on my professional reality. It is very functional." (#DMCW/I/148).

Table 8. Keeping a personal notebook

Building (on) Personal Learning Action. Organising learning as well as selecting content and tasks provided, seems to be part of a bigger SDL action. Experienced adult learners have constructed these self-directed actions while building on prior learning experiences. The learning actions often relate to familiar learning practices and were perceived as useful: "This is the sixth FutureLearn course that I have undertaken. In two I was learning new skills and I had to work very hard, practice repeatedly and ask for help for educators and other learners. This learning is still with me" (#DMCW/LL/128).

Personal learning actions can refer to prior knowledge of the learner. They can refer to pedagogically related learning actions such as reflection. Personal learning actions are built upon prior learning experiences but adjusted depending on the learning goals of the learner, as well as the content provided in the course platform.

### 4.5 Context

Context was a reoccurring category which emerged during the data analysis but was not present in the research sub-questions. Context is interpreted here as defined by Downes [18] from the perspective of the learner and related to three personal environments: the learner's external environment (workplace, learning space, social relations, etc.), internal environment (prior knowledge, philosophical views, learning goals, etc.) and digital environment (prior technological experiences, online tools, etc.).

Contextualizing Content. Content which is applicable to the learner's own profession or interest, works as an extra motivation. This could be content with a direct link to the learner's profession: "the history of medicines was interesting and so was the pharmacology as I felt that I could relate it to my work as a nurse and trainer" (#SOM/I/500), or related to a parallel process: "as a teacher and developer I apply the concept of emergence in curriculum development and in my lessons social sciences at the University of Applied Sciences" (DMCW/I/222).

Proximity of Context as Motivator. Context emerged while learners referred to their working or personal environment and the impact of circumstances on their learning. For example: "I just find the course and info very helpful as I am studying similar topics" (#DMCW/LL/114). The content related data revealed that a learner's context, whether personal and/or professional, influences their motivation. If part of the content did not seem to be of interest to their own context, learners indicated that they skipped that part, "Did not find the technical section on networks relevant to my work, so I skipped it" (#DMCW/I/196). This indicates there is a relation between the context of the learner and the resulting motivation to learn.

## 5 Conclusion

Recapturing SDL by Knowles [6], we can align the findings of this study to SDL for adults. Individuals take the initiative for learning, we can see that it is with or without the help of others (individual versus social learning), they diagnose their learning needs (context, structuring learning), they formulating learning goals (structuring learning), identifying human and material resources for learning (technological and media elements), choosing and implementing learning strategies (according to their individual characteristics), and evaluating learning outcomes (context and aligning learning with their learning goals). SDL in MOOCs results in a heightened ownership of learning. MOOC learning is guided by the learner. Reich [12] stated that a collective research effort is required to fully understand the impact of MOOCs and added that we have terabytes of data about what students clicked and very little understanding of what changed in their heads. This qualitative, learner-centered, bottom-up study shows that learners make conscious decisions when learning in MOOCs. It is the learner who establishes what they will learn, when, and how, which puts the pre-described MOOC structure as envisioned by the MOOC organizer in question. Future work implies taking another look at the SDL and investigating whether this can be set up in a framework that embraces all the elements influencing SDL in MOOCs.

## References


1. Charmaz, K.: Constructing Grounded Theory. Sage, Thousand Oaks (2014)
2. de Waard, I., Kukulska-Hulme, A.: A conceptual framework for learners self-directing their learning in MOOCs. In: Emerging Technologies and Pedagogies in the Curriculum, Eds. Ally, M., Prof. Shengquan Yu. Springer publishing (2019)
3. Wong, J., Baars, M., Davis, D., Van Der Zee, T., Houben, G.J., Paas, F.: Supporting selfregulated learning in online learning environments and MOOCs: a systematic review. Int. J. Human-Comput. Interact. 35, 1–18 (2018)
4. Veletsianos, G., Shepherdson, P.: A systematic analysis and synthesis of the empirical MOOC literature published in 2013–2015. Int. Rev. Res. Open Distrib. Learn. 17(2), 198–221 (2016)
5. Liyanagunawardena, T.R., Lundqvist, K.O., Williams, S.A.: Massive open online courses and economic sustainability. Eur. J. Open Distance. E-Learn. 18(2), 95–111 (2015)
6. Knowles, M.S.: The modern practice of adult education. Association Press, New York (1970)
7. Zhu, M., Sari, A., Bonk, C.: A systematic review of MOOC research methods and topics: comparing 2014–2016 and 2016–2017. In: Proceedings of EdMedia: World conference on Educational Media and Technology. 25 June 2018. EdMedia Innovate Learning 2018, Amsterdam, The Netherlands (2018)
8. Kizilcec, R.F., Schneider, E.: Motivation as a lens to understand online learners: Toward data-driven design with the OLEI scale. ACM Trans. Comput.-Hum. Interact. (TOCHI) 22 (2), 6 (2015)
9. Terras, M.M., Ramsay, J.: Massive open online courses (MOOCs): Insights and challenges from a psychological perspective. Br. J. Educ. Technol. 46(3), 472–487 (2015)
10. Guo, P.J., Reinecke, K.: Demographic differences in how students navigate through MOOCs. In: Proceedings of the First ACM Conference on Learning@ Scale Conference, pp. 21–30. ACM (2014)
11. Littlejohn, A., Hood, N., Milligan, C., Mustain, P.: Learning in MOOCs: motivations and self-regulated learning in MOOCs. Internet High. Educ. 29, 40–48 (2016)
12. Reich, J.: Rebooting MOOC research. Science 347(6217), 34–35 (2015)
13. Loyens, S.M.M., Joshua, M., Rikers, R.M.J.P.: Self-directed learning in problem-based learning and its relationships with self-regulated learning. Educ. Psychol. Rev. 20(4), 411–427 (2008)
14. Cresswell, J.W.: Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications, Inc., Thousand Oaks (2009)
15. Learning logs and all research instruments have been made available here. https://www.academia.edu/9703990/Research_instruments_Learning_logs_questions_for_researching_Self-Directed_Learning_in_experienced_online_learners_engaged_in_FutureLearn_courses
16. Vavoula, G., O'Malley, C., Taylor, J.: A study of mobile learning as part of everyday learning. In: Attewell, J., Savill-Smith, C. (eds.) Mobile Learning Anytime Everywhere: a Book of Papers from MLEARN 2004, pp. 211–212. Learning and Skills Development Agency, London (2005)

17. Ryan, R.M., Deci, E.L.: Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. Am. Psychol. 55(1), 68 (2000)
18. Downes, S.: What is learning context? (blogpost 11 November 2004) (2004). https://www.downes.ca/cgi-bin/page.cgi?post=18